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PRINT DATE: 12/28/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE

NUMBER: M5-6MR-8016-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION:

OCT, 1996

PART NAME

PART NUMBER

VENDOR NAME

VENDOR NUMBER

LRU

ENERGIA POWER PANEL

MC621-0087-0009

RSC-E

CKB>-468-312-001

SRU

PUSH BUTTON SWITCH

PKZ-4 (AGO:360:212:TU)

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

PUSH-BUTTON SWITCHES (TWO DOUBLE POLE SWITCHES UNDER A SINGLE COVER CAP,) TWO POLE, MOMENTARY - APDS "PASSIVE HOOKS FIRING" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB6-83

36V73A8A3SB6-B4

QUANTITY OF LIKE ITEMS: 2

(DWT)

FUNCTION:

PROVIDES THE "PASSIVE HOOKS FIRING" COMMAND STIMULI TO CLOSE THE APPROPRIATE RELAY COILS IN THE PYROTECHNIC FIRE CONTROL UNIT (PFCU).

REFERENCE DOCUMENTS:

- 1) ECN 104-25012A. ODS ELECTRICAL CHANGE NOTICE.
- 2) CKB>=468312=001 _ J*P. SCHEMATIC DIAGRAM -

ANDROGYNOUS PERIPHERAL DOCKING SYSTEM (APDS)

CONTROL PANEL PU-APSS SCHEMATIC.

3) 33Y.5212.005."3. APDS CONTROL UNIT ELECTRICAL

SCHEMATIC.

4) VS70-953104, ODS INTEGRATED SCHEMATIC.

5) 17RC+10>260(F_J *P. PYRO FIRING CONTROL UNIT

ELECTRICAL

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PRINT DATE: 12/28/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE

NUMBER: M5-8MR-8016-01

REVISION#

OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

LRU: MC621-0087-0009

ITEM NAME: PUSH BUTTON SWITCH

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

FAILS OPEN (MULTIPLE CONTACTS WITHIN ONE SWITCH)

MISSION PHASE:

00

ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECT:VITY: 104 ATLANTIS

CAUSE:

A) PIECE PART FAILURE, B) CONTAMINATION, C) VIBRATION, D) MECHANICAL SHOCK, E)

PROCESSING ANOMALY, F) THE 'MAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN

A) PASS

B) N/A

C) PASS

PASS/FAIL RATIONALE:

A)

B١

PYRO SYSTEM CONSIDERED STAND-BY REDUNDANCY

METHOD OF FAULT DETECTION:

NONE.

MASTER MEAS. LIST NUMBERS:

V53X0765E

V53X0766E

CORRECTING ACTION:

NONE.

REMARKS/RECOMMENDATIONS:

CURRENT ORBITER BASELINE INVOLVES USING ACTIVE HOOKS ONLY ON THE ORBITER HALF OF THE ODS. HOWEVER, IN OFF-NOMINAL SITUATIONS, THE MIR ACTIVE HOOKS. WOULD BE UTILIZED TO COMPLETE THE INTERFACE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE NUMBER: MS-6MR-8016-01

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF SWITCH CONTROL CAPABILITY FOR THE PECU "PASSIVE HOOKS FIRING" CIRCUITS.

(B) INTERFACING SUBSYSTEM(S):

NO EFFECT.

(C) MISSION:

NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(\$):

FIRST FAILURE - NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW OR VEHICLE AFTER FIVE FAILURES. 1) A GANG OF SIX HOOKS ON THE ORBITER SIDE FAILS TO CLOSE REQUIRING USE OF THE MIR SIDE HOOKS TO COMPLETE THE INTERFACE. 2) A HOOK IN THE MIR SIDE OR THE INTERFACE FAILS TO OPEN RESULTING IN LOSS OF NOMINAL MIR SIDE UNDOCKING CAPABILITY. 3) ONE OF TWO ASSOCIATED "PASSIVE HOOKS FIRING" SWITCHES FAILS OPEN. NO EFFECT. DEGRADED COMMAND IMPLEMENTATION REDUNDANCY. 4) ASSOCIATED SWITCH FAILS OPEN. LOSS OF CAPABILITY TO IMPLEMENT THE "PASSIVE HOOKS FIRING" COMMAND.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): N/A

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:

NONE. CRITICALITY UNCHANGED. WORKAROUNDS ADD TO REDANDANCY.
5) FAILURE OF EVA TO REMOVE 96 BOLTS - LOSS OF ALL UNDOCKING CAPABILITY.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: MINUTES

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT? YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:

CREW WOULD HAVE SUFFICIENT TIME TO PERFORM EVA.

HAZARDS REPORT NUMBER(S): ORBI 401A

HAZARD DESCRIPTION:

INABILITY TO SEPARATE ORBITER AND MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGR

; M. NIKOLAYEVA

DESIGN ENGINEER

: B. VAKULIN

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